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Indian Standard

PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART IV DAMP HEAT TEST

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PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART IV DAMP HEAT TEST

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Indian Standard

PROCEDURE FOR BASIC CLIMATIC AND DURABILITY TESTS FOR OPTICAL INSTRUMENTS

PART IV DAMP HEAT TEST

0. FOREWORD

0.1 This Indian Standard (Part IV) was adopted by the Indian Standards Institution on 16 August 1982, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Fast development in the field of instruments has brought a significant change in their basic content and design. It has been felt over the years that IS : 2352-1963* does not cater for the present day needs of the instruments and is also not in line with the recent trends in climatic and environmental testing procedures to be adopted for improving their quality and reliability. It has, therefore, become necessary to have uniform and more rational testing procedures as far as possible. This series of standards on climatic and durability tests (IS : 10236) has been prepared with this objective.

0.2.1 It is proposed to withdraw the existing Indian Standard (IS : 2352-1963*) as soon as the tests mentioned therein are covered in the new series (IS : 10236).

1. SCOPE

1.1 This standard (Part IV) covers the procedure for conducting damp heat test for optical instruments.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 10236 (Part I)† shall apply.

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*Procedure for basic climatic and durability tests for optical instruments.

†Procedure for basic climatic and durability tests for optical instruments: (Part I General (*under preparation*).

3. OBJECT

3.1 The object of this test is to determine the suitability of the optical instruments for use and/or storage under conditions of high humidity and wide temperature variations.

4. INITIAL MEASUREMENTS

4.1 The instrument shall be visually examined and checked optically, electrically and mechanically as required by the relevant instrument specification.

5. TEST CHAMBER

5.1 The chamber used for this test shall meet the requirements given in **5.1.1** to **5.1.9**.

5.1.1 The chamber shall be capable of maintaining its working space at any temperature up to 55°C with a tolerance of ± 2°C and relative humidity not less than 95 percent.

5.1.2 The temperature and humidity of the chamber shall be monitored by sensing devices suitably located in the working space.

5.1.3 The air in the chamber shall be continuously agitated to ensure that the conditions throughout the chamber are homogeneous and are as near as possible to those prevailing in the immediate vicinity of the sensing device.

5.1.4 Care shall be taken that specimen under test shall not be subjected to direct radiation from the heating element of the chamber and any heat dissipation of the specimen shall not appreciably influence the conditions in the chamber.

5.1.5 The chamber shall have provision to supply electric power to the specimen under test from external source.

5.1.6 The chamber shall have provision of a suitable viewing window to see functioning of instrument.

5.1.7 Condensed water shall be continuously drained from the chamber and shall not be used again until it has been purified.

5.1.8 Water used for maintenance of chamber humidity shall have a resistivity of not less than 500 ohm metre.

5.1.9 Condensed water from the walls and the roof of the chamber shall not fall on the specimen.

6. TEST SEVERITY

6.1 The test severity indicated by a combination of high humidity and high temperature and period of duration shall be as specified in the relevant instrument specification. The actual values may be selected from the following:

Upper temperature 40°C, RH 95-100 percent and number of cycles (each cycle of 24 hours)............2 or 6.

Upper temperature 55°C, RH 95-100 percent and number of cycles (each cycle of 24 hours)..................1 or 2 or 6.

7. TEST PROCEDURE

7.1 The instrument shall be subjected to this test in the unpacked condition.

7.2 At the laboratory temperature the instrument under test shall be introduced into the chamber.

7.3 The temperature of the chamber shall be raised from laboratory temperature to 55 ± 2°C or 40 ± 2°C in a period of 90 to 150 minutes during which the RH shall be between 80 and 100 percent.

7.4 On attaining the temperature and humidity equilibrium, if required by the relevant instrument specification, the electrical or electronic arrangement, if fitted in the instrument, shall be switched on from outside to check whether it is functioning. After this verification, the arrangement shall be switched off.

7.5 After temperature equilibrium has been attained the instrument shall remain at the specified serverity for 16 hours.

7.6 During the final half hour of the 16 hours period, if required by relevant instrument specification, the electrical/electronic arrangement fitted in the instrument shall be switched on from outside and functioning tests as required by the relevant instrument specification shall be carried out.

7.7 The atmosphere with the chamber shall then be allowed to cool down to the laboratory temperature in not less than one hour during which time saturation of water vapour shall occur.

7.8 The instrument shall remain under these conditions to complete a 24-hour cycle.

7.9 The instrument shall be subjected to the above conditions continuously for 1, 2 or 6 cycles as required by the relevant instrument specification.

7.10 Recovery — After specified number of cycles the instrument shall be removed from the chamber. Any condensed water adhering to the instrument shall be removed by shaking. The instrument shall then be kept under standard atmospheric conditions for recovery for not less than one hour nor more than two hours.

8. FINAL MEASUREMENTS

8.1 After recovery the instrument shall be visually examined and tested for its performance in accordance with the relevant instrument specification.

9. DETAILS TO BE GIVEN IN RELEVANT INSTRUMENT SPECIFICATION

9.1 When this test is included in the relevant instrument specification the following details shall be given as far as applicable:

a) Initial measurements/observations,
b) Temperature severity;
c) Number of cycles;
d) Tests to see functioning of the electrical/electronic arrangement from outside during conditioning, if so required;
e) Duration of recovery if other than specified;
f) Final observations/measurements; and
g) Any deviation from the normal procedure.